

WHAT IS CLAIMED IS:

1. A lithographic projection apparatus, comprising:
  - a radiation system constructed and arranged to provide a projection beam of radiation;
  - a support structure constructed and arranged to supporting a patterning device, the patterning device constructed and arranged to pattern the projection beam according to a desired pattern;
  - a substrate table constructed and arranged to hold a substrate;
  - a projection system constructed and arranged to project the patterned beam onto a target portion of the substrate;
  - a translucent plate positioned between an optical element of the projection system and the substrate;
  - a first fluid having a first index of refraction filling a first space between the substrate and the translucent plate; and
  - a second fluid having a second index of refraction filling a second space between the translucent plate and the optical element.
2. An apparatus according to claim 1, wherein the first index of refraction is greater than the second index of refraction.
3. An apparatus according to claim 1, wherein the second index of refraction is greater than the first index of refraction
4. An apparatus according to claim 1, wherein the translucent plate has a third index of refraction.
5. An apparatus according to claim 4, wherein the third index of refraction is between the first index of refraction and the second index of refraction.
6. An apparatus according to claim 4, wherein the third index of refraction is substantially equal to the first index of refraction.
7. An apparatus according to claim 4, wherein the third index of refraction is substantially equal to the second index of refraction.
8. An apparatus according to claim 1, wherein the first index of refraction is substantially equal to an index of refraction of the substrate.

9. An apparatus according to claim 1, wherein the second index of refraction is substantially equal to an index of refraction of the optical element.
10. An apparatus according to claim 1, wherein the first fluid is one of a perfluoropolyether fluid and water and the second fluid is one of a perfluoropolyether fluid and water.
11. An apparatus according to claim 1, wherein the first and second fluids are perfluoropolyether fluids.
12. A device manufacturing method, comprising:
  - providing a substrate that is at least partially covered by a layer of radiation-sensitive material;
  - projecting a patterned beam of radiation onto a target portion of the layer of radiation-sensitive material; and
  - filling a space between an optical element of a projection system and the substrate with first and second fluids having first and second indices of refraction, respectively.
13. A device manufacturing method according to claim 12, further comprising: separating the first and second fluids with at least one translucent plate.
14. A device manufacturing method according to claim 13, wherein a first space between the substrate and the translucent plate is filled with the first fluid and a second space between the translucent plate and the optical element is filled with the second fluid.
15. A device manufacturing method according to claim 12, wherein the first index of refraction is greater than the second index of refraction.
16. A device manufacturing method according to claim 12, wherein the second index of refraction is greater than the first index of refraction.
17. A device manufacturing method according to claim 14, wherein the first index of refraction is substantially equal to an index of refraction of the substrate.
18. A device manufacturing method according to claim 14, wherein the second index of refraction is substantially equal to an index of refraction of the optical element.
19. A device manufacturing method according to claim 12, wherein the first fluid is one of a perfluoropolyether fluid and water and the second fluid is one of a perfluoropolyether fluid and water.
20. A device manufacturing method according to claim 12, wherein the first and second

fluids are perfluoropolyether fluids.

21. A device manufacturing method according to claim 13, wherein the translucent plate has a third index of refraction between the first and second indices of refraction.
22. A device manufacturing method according to claim 21, wherein the third index of refraction is substantially equal to the fist index of refraction.
23. A device manufacturing method according to claim 21, wherein the third index of refraction is substantially equal to the second index of refraction.